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(57) A portable shield to be held in front of a person's body to protect that person against injury by a bullet or other missile is formed with a

surrounding metal frame 2 containing a board 16 of bonded layers of woven aramid fabric having adhered to its front a layer of ballistic ceramic tiles 18, 20. The tiles 20 are thicker and create a zone of even greater resistance to bullets or other missiles. At the back the shield has a strap 12 for a person's forearm and a handle 10 for grasping by the hand on that arm. The handle 10 can also be pivoted out to form a leg which props up the shield when it is stood on the ground.

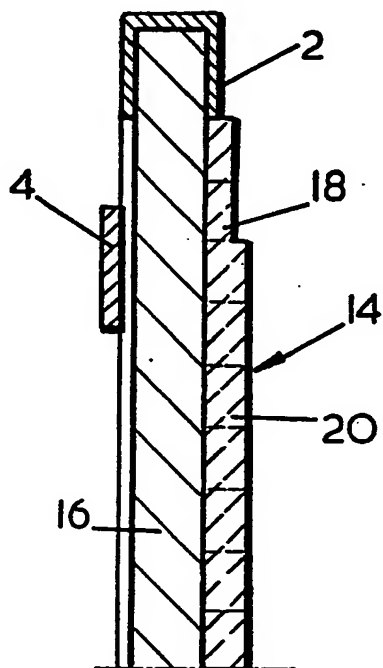


FIG. 2

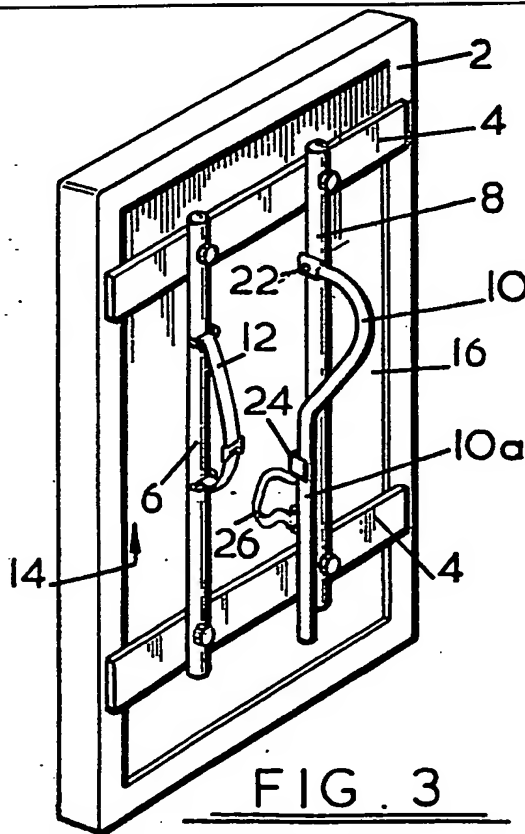


FIG. 3

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy. This print embodies corrections made under Section 117(1) of the Patents Act 1977.

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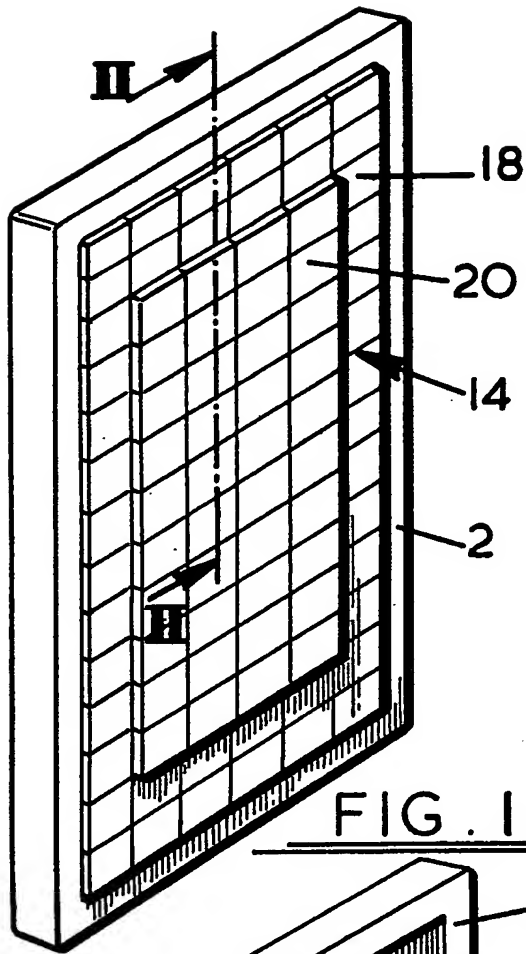


FIG. 1

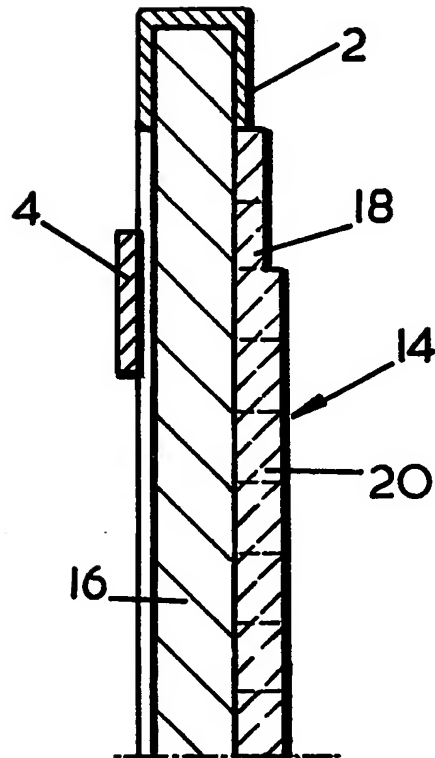


FIG. 2

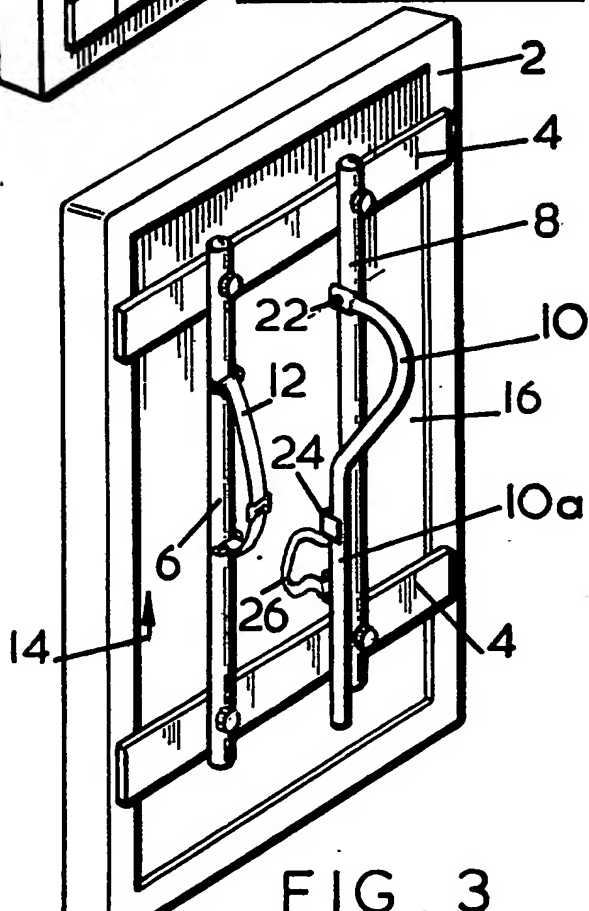


FIG. 3

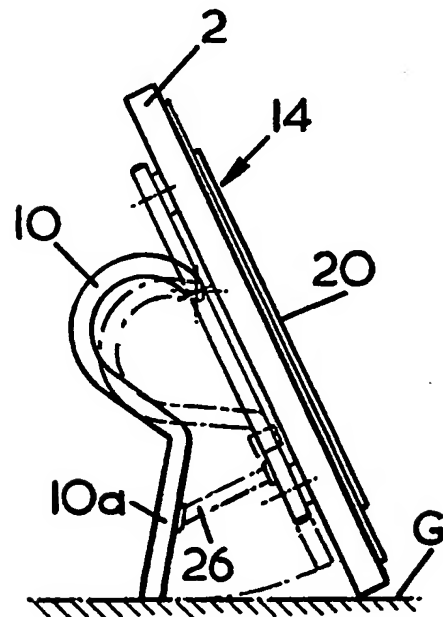


FIG. 4

SPECIFICATION

Portable shield

This invention concerns a portable shield to be held in front of a person's body to protect that person against injury by a bullet or other missile for example metal or other fragments or splinters.

According to the invention a portable shield to be held in front of a person's body to protect that person against injury by a bullet or other missile comprises a panel arrangement which can be carried by a person and wherein the whole or substantially the whole of the volume of the panel arrangement is occupied by material providing high resistance to passage of a bullet or other missile through this arrangement, holding means provided at a first main face of the panel arrangement whereby the latter can be held by a person's upper limb such that the arrangement is in front of that person's body with the other or second main face of the panel arrangement facing away from the body, and said panel arrangement having an area or zone of even greater resistance.

The zone of greatest resistance can be provided by a thickening of material forming the panel at that zone.

The zone may be wholly or partially surrounded by the remainder of the panel arrangement.

Preferably the zone is so disposed that when the shield is in use held before a person the zone of greatest resistance is disposed at least in front of an upper part of the person's torso since it is that region of the body that bullets are often directed in order to improve the chance of hitting and seriously injuring the person.

The shield may be provided with means providing a support at the first main face whereby the shield may be stood on the ground with the support holding or propping up the shield so that a person may crouch behind it. Several such shields stood side by side can form a protective wall. The support may be a leg hingedly mounted at the first main face of the panel arrangement. This leg may comprise a handle for the shield to be held on the arm of a person and an additional arm loop or strap may be provided at the first main face. Locking means may be provided to hold the leg in a hingedly closed position when it is required to act as a handle.

The shield preferably provides high resistance to high velocity bullets for example bullets comprising ferrous material.

The bullet or missile resistant material may be a composite and may be supported in or on a support or frame.

The material may comprise a layer or layers of ballistic ply-wood to a side of which facing away from the person's body, may be attached, for example by adhesive, further armour material for example slate or ballistic ceramic tiles known per se. The tiles may be formed, for example, from alumina, silicon nitride, silicon carbide or boron carbide.

The zone of increased resistance may be formed by using a layer of thicker tiles or slate

pieces than that over the remainder of the panel arrangement at the second main face. Tiles used at the zone of increased resistance may be 8.0 mm thick whereas over the remainder of the panel they may be 6.4 mm thick.

If desired the material may comprise an aramid fibre material, for example a plurality of layers of woven aramid fibre secured together. This may be by an adhesive material so the fabric layers form an integral board for example about 1 cm thick.

The aramid fabric may be formed of aramid fibre KEVLAR 29 or KEVLAR 49 (Trade Mark of Du Pont) sold by Fothergill & Harvey Ltd. under their references D235 and D208 respectively.

The KEVLAR 29 fabric may weigh about 279 gm/m², be about 0.38 mm thick, be of plain weave from warp and weft ends each of about 12.2/cm, the yarn used being of about 1110 decitex.

The KEVLAR 49 fabric may weigh about 218 gm/m², be about 0.33 mm thick, be of plain weave from warp and weft ends each of about 6.7/cm, the yarn used being of about 1580 decitex.

The aramid fabric board of, for example KEVLAR 49, may comprise twenty-seven fabric layers. But a lesser or greater number of layers may be used.

The invention will now be further described by way of example with reference to the accompanying drawings in which:—

Fig. 1 is a front perspective view of portable shield formed according to the invention;

Fig. 2 is an enlarged fragmentary section in II—II in Fig. 1;

Fig. 3 is a view of the shield in Fig. 1 from the rear, and

Fig. 4 illustrates the shield of Fig. 1 stood on a ground surface.

The portable shield has a rectangular metal frame 2 of channel section on the back of which are cross struts 4 mounting bars 6 and 8. The bar 8 has a handle 10 for grasping and the bar 6 has a support loop 12 to engage the forearm having the hand of the person grasping the handle, so that the shield can be carried and held in front of that person's body.

Supported by frame 2 is a panel 14 of bullet or missile resistant material comprising a rear layer 16 which may be a waterproof board of bonded, aramid fibre, woven fabric in which the fabric may be of KEVLAR 49 and a front layer of ballistic ceramic tiles 18, 20 adhered to layer 16. The tiles 20 are thicker and form a central zone of increased resistance.

The handle 10 is pivoted at 22 to the bar 8 and has an extension 10a which can be detachably locked to the bar by catch or lock means 24. When the handle 10 is unlocked it can be used as a supporting leg as shown in Fig. 4 held by a strap or stay 26 to prop up the shield on a ground surface G to form a protective wall element.

If desired the frame 2 and panel arrangement 14 can be enclosed in a waterproof cover or fabric

or plastics sheet.

The shield size may be about 53 cm by about 78 cm.

CLAIMS

- 5 1. A portable shield to be held in front of a person's body to protect that person against injury by a bullet or other missile comprising a panel arrangement which can be carried by a person and wherein the whole or substantially the whole of
- 10 the volume of the panel arrangement is occupied by material providing high resistance to passage of a bullet or other missile through the arrangement, holding means provided at a first
- 15 main face of the panel arrangement whereby the latter can be held by a person's upper limb such that the arrangement is in front of that person's body with the other or second main face panel arrangement facing away from the body, and said panel arrangement having an area or zone of even
- 20 greater resistance.
 2. A shield as claimed in claim 1, in which said zone is provided by a thickening of material forming the panel at that zone.
 3. A shield as claimed in claim 1 or claim 2, in
 - 25 which said zone is so disposed that when the shield is in use and held up before a person the zone of greatest resistance is disposed at least in front of the upper part of the person's torso.
 4. A shield as claimed in any one of claims 1 to
 - 30 3, in which the zone is wholly or partially surrounded by the remainder of the panel arrangement.
 5. A shield as claimed in any one preceding claim, in which material forming the panel
 - 35 arrangement at the zone of greater resistance comprises slate.
 6. A shield as claimed in any one of claims 1 to
 - 40 4, in which the material forming the panel arrangement at the zone of greater resistance comprises ballistic ceramic tiles.
 7. A shield as claimed in any one of claims 1 to 4, in which the panel arrangement comprises ballistic ply-wood.
 8. A shield as claimed in any one of claims 1 to
 - 45 4, in which the panel arrangement comprises an aramid fibre material.
 9. A shield as claimed in claim 8, in which the panel arrangement comprises a board formed of layers of woven aramid fabric bonded together.
 - 50 10. A shield as claimed in any one of claims 1 to 4 in which the panel arrangement comprises a first layer of ballistic ply-wood or board of woven aramid fabric, and a second layer in front of the first, said second layer being formed of slate or
 - 55 ballistic ceramic tiles, and the second layer being thicker at said area or zone.
 11. A shield as claimed in any one preceding claim, in which the shield is provided with means providing a support at the first main face whereby
 - 60 the shield can be stood on the ground with the support holding or propping up the shield.
 12. A shield as claimed in claim 11 in which the support is a leg movably mounted on the panel arrangement, and the holding means comprises
 - 65 the leg disposed in one attitude whereas the leg moved to another attitude acts as said support.
 13. A shield as claimed in any one preceding claim, in which the panel arrangement has a waterproof cover.
 - 70 14. A portable shield to be held in front of a person's body to protect that person against injury by a bullet or other missile, substantially as hereinbefore described with reference to the accompanying drawing.